Sprague GeoServices
480 Salvas Road, Huntington, VT 05462 (802) 434-5522

May 21, 1998

Mr. Chuck Schwer
Vermont DEC
Hazardous Materials Management Division
West Office Building
103 South Main Street
Waterbury, Vermont 05671-0404

97-2296

MAY 25 10 08 AM '98

RE: Removal and Polyencapsulation of
Petroleum Contaminated Soil
Ben & Jerry's Homemade Inc. Plant
Waterbury, Vermont

Dear Mr. Schwer:

1.0 INTRODUCTION

The following presents Sprague GeoServices' report regarding the removal and polyencapsulation of petroleum contaminated soil at Ben & Jerry's Waterbury, Vermont facility. Isolated areas of petroleum contaminated soils were identified by Griffin International during the recent upgrade of piping associated with a #2 Fuel Oil tank. During the piping upgrade, total volatile organic compound (VOC) concentrations as measured with a Photoionization Detector (PID) were reported to range from 14 to 70 parts per million (ppm), in the area below the fill pipe. A summary of the pipe upgrading activities was submitted to the Vermont Department of Environmental Conservation (DEC) in a letter-report to Ms Susan Thayer dated September 26, 1997. The report was written by Griffin International and entitled "Piping Replacement/Upgrade, Ben & Jerry's Homemade Inc." In the DEC response letter written by Mr. Chuck Schwer, dated March 26, 1998, it was recommended that the petroleum contaminated soils be removed and treated in accordance with the "Agency Guidelines for Petroleum Contaminated Soil and Debris", dated August 1996.

The fill pipe is located up slope (west), and immediately adjacent to a paved driveway which is located behind the main Ben and Jerry's facility. Immediately below the fill pipe, is a stone-lined drainage ditch, which runs along the west edge of the drive. The drainage ditch eventually discharges into a settling pond, located on the southwest side of the intersection of Ben and Jerry's main entrance and Route 100 (Figure 1).

2.0 SOIL MONITORING AND EXCAVATION ACTIVITIES

On April 28, 1998, Ben and Jerry's Homemade Inc. personnel collected soil samples in the vicinity of the fill pipe using a hand shovel. Sprague GeoServices monitored the soil samples using a PID to determine total VOC concentrations. In order to determine the down-gradient extent of the petroleum contamination, the soil sampling was initiated in the drainage ditch, approximately 30 feet down-gradient of the fill pipe. A soil sample was collected from a depth of approximately 12 inches below the bottom of the ditch and placed in a plastic bag. The total VOC concentration of the soil headspace was measured with a PID in accordance with the procedures outlined in the "Agency Guidelines." This headspace screening procedure was continued at approximately 10-foot intervals up to the area of the fill pipe. The total VOC concentrations ranged from 2.8 to 3.2 ppm in the area 10 to 30 feet down gradient of the fill pipe. The headspace of the soils in the immediate area of the fill-pipe ranged from 18 to 47 ppm. A summary of these findings is presented in Table 1, and a sketch map of the area is presented as Figure 1.

Given that soil headspace readings in the vicinity of the fill pipe were >10 ppm, the soils in this vicinity were hand excavated and polyencapsulated on-site. A total of less than one cubic yard of petroleum contaminated soil was removed from the area immediately below the fill pipe on April 28,1998. It was not possible to remove all the contaminated soils by hand, therefore, Ben and Jerry's Inc. contracted McIntyre Fuels to complete the soil removal activities at a later date, with use of an excavator.

On May 8, 1998, excavation activities in the vicinity of the fill pipe continued. A layer of black stained sandy soil was observed in the area below the fill pipe, at a depth of approximately 1-1.5 feet below the top of the drainage ditch. The soil had a strong petroleum odor, with PID readings on the order of 14 to 85 ppm (Table 2). The soils below the black-stained petroleum contaminated soil were brown/tan colored. The soil sample collected from this layer had a PID headspace reading of only 2-3 ppm, suggesting that the petroleum contamination does not appear to extend vertically downward below approximately 1.5 to 2.5 feet (Figure 2).

Black-colored soils were also observed down-gradient of the cement pad (located immediately opposite of the fill pipe, on the east side of the drainage ditch). However, this black-colored soil did <u>not</u> have a petroleum odor, and had a soil PID headspace reading of only 2 ppm.

Groundwater was encountered in the excavation at a depth of approximately 1–1.5 feet. In isolated areas, near the most contaminated soils, a petroleum sheen was observed on the surface of the groundwater. Most of the groundwater encountered however, did not show obvious signs of petroleum contamination. The groundwater and sandy nature of the soils combined to make the excavation a bit unstable, and made it somewhat difficult to collect discrete soil samples both within and beyond the extent of the excavation.

In general, it appeared that the petroleum contaminated soil (>10 ppm) extended along the drainage ditch approximately 6-8 feet down-gradient and greater than 2-3 feet up-gradient of the fill pipe. It is thought to extend slightly beyond the width of the ditch

(approximately 3-4 feet wide). The vertical extent of the petroleum contaminated soil is thought to be approximately 1.5 to 2.5 feet deep, as witnessed by the brown/tan soil (PID 2-3 ppm) below the black-stained soil. Although the bulk of the contaminated soil is thought to have been removed; it was not possible to excavate all the contaminated soil in the up-gradient direction of the ditch due to the proximity of numerous buried lines, including a water line, electrical line and the abandoned fuel lines. The PID headspace concentration of the soils collected from this area (the limit of the excavation in the up-gradient direction) was 14 ppm. Given that this is significantly lower than the peak PID concentration of 85 ppm, it appears that the level of petroleum contamination is declining in the up gradient direction (Figure 2).

The source of the petroleum contamination is not known; however, based on its proximity to the fill pipe, it is likely due to a spill or overfill event. The fill pipe is currently equipped with a spill/overfill containment devise to help prevent future spills in this area.

3.0 SOIL STOCKPILE

The Ben and Jerry's facility is serviced by the municipal water system, and there are no drinking water wells or other sensitive receptors adjacent to the site. Therefore, according to the "Agency Guidelines" the soils are eligible to be treated on-site. A total of approximately 5-6 cubic yards of petroleum contaminated soil have been polyencapsulated on-site. The soils are located in a secured area up-slope of Ben & Jerry's wastewater treatment facility. With concurrence from the DEC, the soils were placed on two layers of 4-mil clear polyethylene sheeting. The soils were then covered with another two layers of the plastic sheeting to fully encapsulate the soils.

A total of six (6) soil samples were collected from the soil stockpile and screened for total VOCs with a PID. Headspace readings ranged from 2.0 to 46 ppm, with an average of concentration of 18.8 ppm (Table 3). In accordance to the "Agency Guidelines" the soils will remain polyencapsulated on-site until PID readings are less than 1 ppm, and there is no olfactory or visual evidence of petroleum contamination. Once these conditions are met, the soils will be thin-spread on site with approval from the Vermont Department of Environmental Conservation (DEC).

4.0 SUMMARY AND CONCLUSIONS

Approximately 5-6 cubic yards of petroleum contaminated soil was removed from the drainage ditch in the vicinity of the #2 fuel oil tank fill pipe on April 28 and May 8, 1998. PID headspace readings of the contaminated soil ranged from 14 to 85 ppm. PID headspace readings of the soils adjacent to the excavation range from 2-14 ppm. It was not possible to remove all of the petroleum contaminated soil, especially in the up gradient direction of the drainage ditch, due to the proximity of buried lines. Therefore, although some residual petroleum contamination is known to remain in this area, it is thought that the majority of the contaminated soil has been removed.

The petroleum-contaminated soils have been polyencapsulated on-site in an area secured from public access. The soils will remain polyencapsulated on-site until PID readings are less than 1 ppm, and there is no olfactory or visual evidence of petroleum contamination.

5.0 RECOMMENDATIONS

The Ben and Jerry's facility is serviced by the municipal water system, and according to Ben & Jerry's Inc. personnel, there are no drinking water wells or other sensitive receptors adjacent to the site. Natural attenuation of the petroleum-related compounds will continue to occur on the residual petroleum contamination remaining in the ground in the vicinity of the fill pipe. The residual contamination does not appear to be a threat to human health or the environment, therefore, no further activity is recommended with regard to this incident.

With regard to the soil stockpile, it is recommended that the soils be screened for the presence of VOCs with a PID on a quarterly basis, with the exception of the winter months. During the quarterly monitoring, the integrity of the polyethylene will be observed and maintained as necessary. Quarterly reports, which present the results of the soil stockpile monitoring will be submitted to the DEC for their review.

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Please feel free to contact me if questions or comments regarding this submittal.

Sincerely,
Sprague GeoServices

Cindy Sprague
Principal Hydrogeologist

Encl.

Cc: Andrea Asch, Ben & Jerry's Homemade Inc.

C: myfiles.spragco.b&j.soil stockpile report

Table 1
Ben & Jerry's Homemade Inc.
Total VOC Concentrations as Measured with a PID
April 28, 1998

Sample #	Head Space PID (ppm)	Location
1	2.2	Drainage ditch 30' down gradient of fill pipe
2	3.1	Drainage ditch 20' down gradient of fill pipe
3	2.8	Drainage ditch 10' down gradient of fill pipe
4	47	Drainage ditch near fill pipe
5	18	Drainage ditch just down gradient of fill pipe
6	43.1	Drainage ditch just up gradient of fill pipe
7	42	In excavation

Refer to Figure 1 for Sample Locations

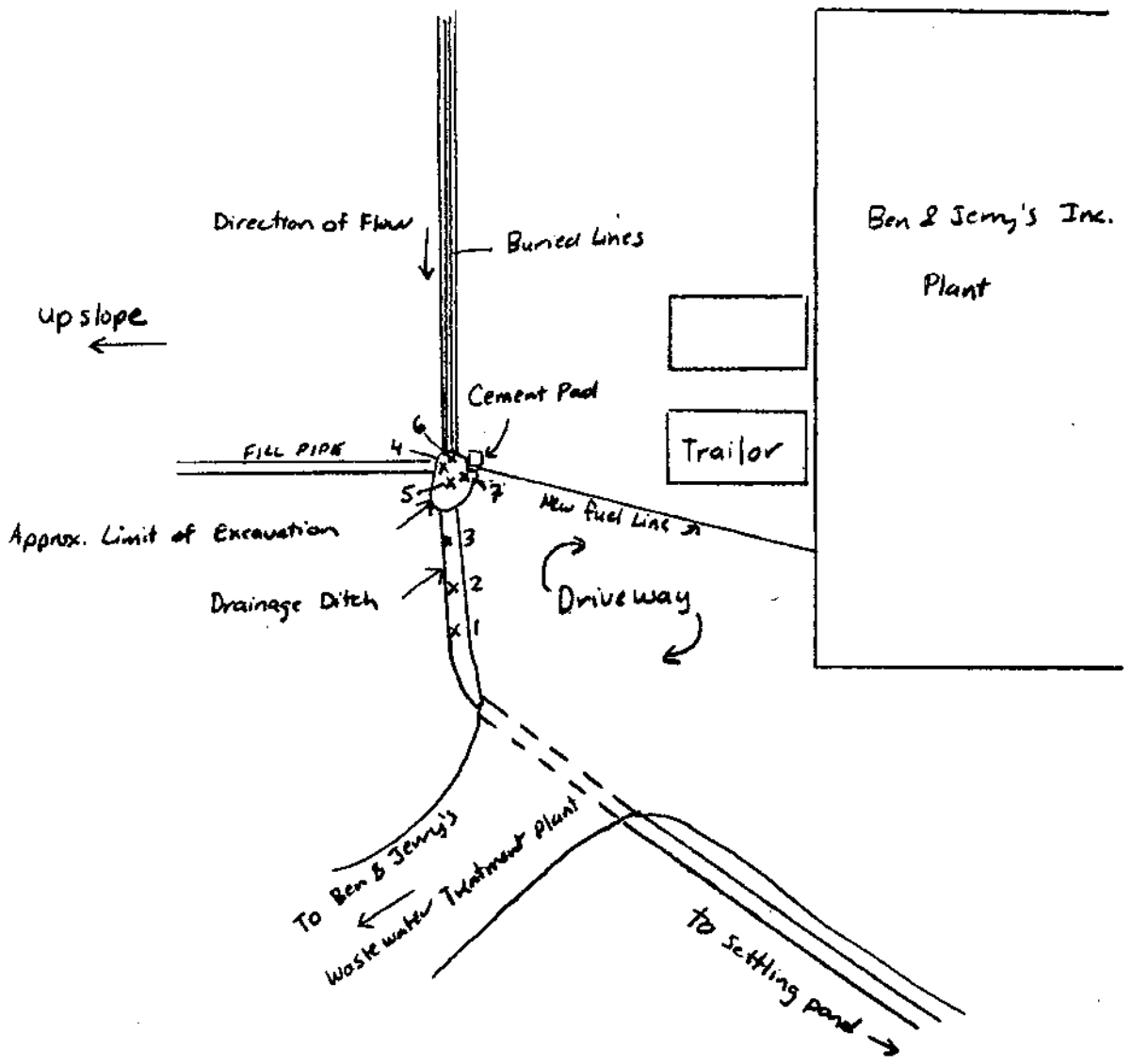
Table 2
Ben & Jerry's Homemade Inc.
Total VOC Concentrations as Measured with a PID
May 8, 1998

Sample #	Head Space PID (ppm)	Soil Screening PID (ppm)	Location
11		20	Black stained soil in drainage ditch just down gradient of fill pipe
12		30	Black stained soil in drainage ditch just down gradient of fill pipe
13	2		Brown/tan soil below black stained soil
14	15		Black stained soil below fill pipe
15	85		Black stained soil below fill pipe
16	85		Black stained soil near concrete pad (petrol odor)
17	2		Black colored soils SE of concrete pad (no odor)
18	14		Brown/tan soil in drainage ditch 3 feet up gradient of fill pipe. (Limit of up gradient excavation due to presence of buried lines in ditch)

Refer to Figure 2 for Sample Locations

Table 3
Ben & Jerry's Homemade Inc.
Soil Stockpile
Total VOC Concentrations as Measured with a PID
May 8, 1998

Sample #	Head Space PID (ppm)	Location
1	35	Soil Stockpile
2	2.0	Soil Stockpile
3	2.5	Soil Stockpile
4	24	Soil Stockpile
5	46	Soil Stockpile
6	3.5	Soil Stockpile
Ave.	**18.8**	



LEGEND: X 2 Soil Sample Location

Ben & Jerry's Homemade Inc.
Soil PID Monitoring Locations
April 28, 1998

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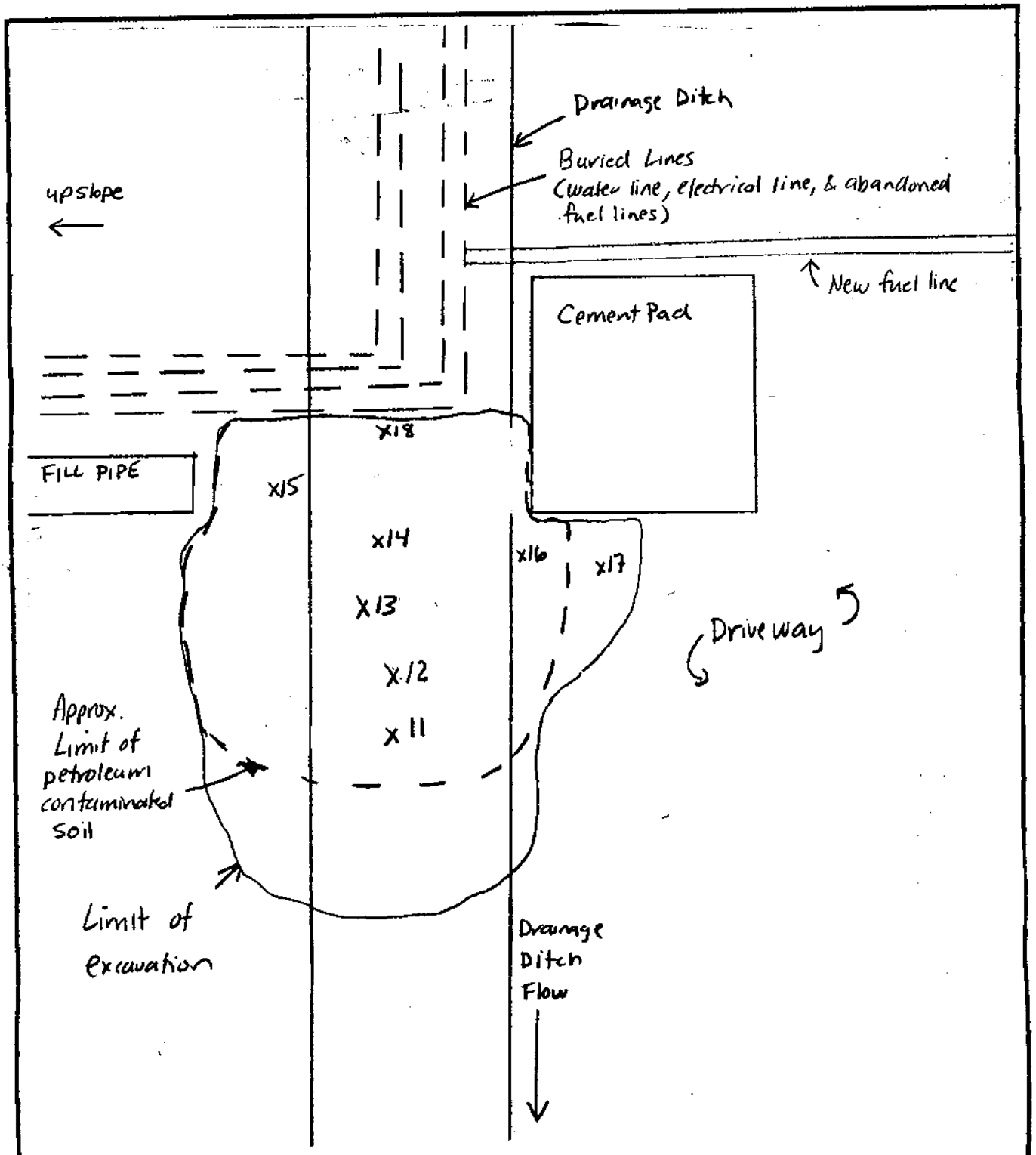
FIGURE 1 NOT TO SCALE



LEGEND: X 11 Soil Sample Location

Ben & Jerry's Homemade Inc.
Soil PID Monitoring Locations
May 8, 1998

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FIGURE 2 NOT TO SCALE